THE

REPORT

OF

WILLIAM ELSTOBB, &c.

THE REPORT OF WILLIAM ELSTOBB, LAND SURVEYOR AND ENGINEER, ON THE STATE OF THE NAVIGATION BETWEEN CLAYHITHE AND DENVER SLUICE, SEPTEMBER 28, 1778.

To which will be added,

An APPENDIX,

Containing ſome Facts and Obſervations relative to the Proceedings of the Bedford Level Corporation.

Publiſhed by Order of the CAMBRIDGE COMMITTEE.

"*In theſe our Proceedings to, and in our Work of Draining the ſaid Whole Level of the Fens, we ſhall not forget, nor in any Wiſe neglect to perform, the Preſervation of the River between Cambridge and Lyn, according to his Majeſty's Command, not to hurt the Navigation thereof. As alſo that we ſhall not Prejudice the Port or Haven of Lyn.*"

The Undertakers Propoſals, dated 13th April, 1628.

CAMBRIDGE:

Printed by F. HODSON; and Sold by T. & J. MERRILL, Bookſellers, in Cambridge; B. WHITE, in Fleet-ſtreet; J. WILKIE, in St. Paul's Church-Yard; and RICHARDSON and URQUHART, at the Royal-Exchange, London; Mr. HOLLINGWORTH, Lynn; and Mr. DECK, Bury.

M.DCC.LXXIX.

To the GENTLEMEN MERCHANTS *and* NAVIGATORS *concerned in the* NAVIGATION *from* CAMBRIDGE *to* LYNN.

GENTLEMEN,

ACCORDING to order of the Committee, on Tueſday the 10th of September Inſtant, I went from Cambridge, and entered upon the Examination of the River, from Clayhithe to Denver Sluice; but the Boats provided being obliged to wait for the Mill Waters, to get down to Jeſus Green Sluice, and over Cheſterton Gravel, it was ſo late before we could proceed, that we could get no farther than Upwear that Evening.

On Friday the 11th, we proceeded from Upwear to Prickwillow Bridge, and on Saturday the 12th, went from thence down to Denver Sluice, where we arrived at about half an Hour after 10 o'Clock in the Morning, when the Tide was riſing, and it had been Flood about an Hour; and by Obſervation I found it was High Water about half an Hour after Eleven, at which Time I found the High Water Mark to be five Feet two Inches below the Head of the Sea Doors, in the Weſt Water Way, and up to the twelve Foot Mark upon the Poſt in the Pen Sluice; and the Freſhes within ſide the Door of the Weſt Water-way were eight Feet upon the Threſhold at the Time of high Water, which was no higher, or ſcarcely ſo high as in the Spring of the Year 1776, it was found to be at low Water, and the Depth in the River above the Sluice was

nine Feet, where in the Time beforementioned it had been found to be ten Feet at low Water, and the Depth at ſome diſtance below the Sluice after the Water was ſomething fallen, was eight Feet four Inches, whereabouts in 1776 it was eleven Feet at Low Water, at which Time the Low Water Mark in the Weſt Water-way, was eleven Feet three Inches below the Head of the Sea Door of that Water-way, whichis ſix Feet one Inch below the preſent High Water-mark.

I was informed, that the Sea Doors upon the ſpring Tides are generally kept ſhut about ſeven Hours, during which Time the Freſhes within ſide keep riſing againſt the Doors, and in that Time, in the ordinary State of the River, riſe about three Feet perpendicular.

And as it would have been too late to have waited for the Time of Low Water, I did not ocularly obſerve the Low Water-Mark, but by the beſt Information I could get, the different State of the Water in the River above the Sluice, to what I had found it in the Spring of the Year 1776, and by Meaſures then and now taken, I had Reaſon to conclude that it was about one Foot and an half lower than it was at that Time, and that the Tide had flowed about ſeven Feet and an half above the preſent Low Water-Mark. And that from that concluſion the Low Water-Mark in the Section, I have now made of the River, is determined; the Falls are ſimilar to what they were before made in 1776; and the Inequalities in the Bottom of the River are determined by the Soundings now taken, with proper Allowance in the Depths, in the lower Parts approaching Denver Sluice, for the different State the Water was then in, by its being raiſed by the Stoppage of the Doors, to what it would be when reduced to the Low Water-Mark, which near the Sluice makes a conſiderable Difference, which is allowed for in the Section.

Denver Sluice is conſtructed with three principal Water Ways, of about 20 Feet 10 Inches each, between Abutment and

and Abutment, but in the Clear Water-way only 18 Feet, beſide a Pen Sluice on the Eaſt Side, about 13 Feet ſix Inches clear Water-way; and another Paſſage of about 19 Feet clear Water-way, called Ruſſel's Eye; making in the Whole, a clear Water-way of about 86 Feet ſix Inches.

In each Arch there was a Pair of Flood Gates, and a Pair of Ebb Doors, but one of the Ebb Doors in the Weſt Water-way is now wanting, and to Ruſſel's Eye there are no Ebb Doors.

The Ebb Doors as they are now conſtructed, cannot raiſe the Water at the Sluice above two Feet higher than it naturally riſes at this preſent Time, by the Stoppage of the Freſhes during the Time the Doors are ſhut by the Tides.

From Denver Sluice to Southery Ferry, the Soundings were various, from ſix Feet ſix Inches to 10 Feet, but moſtly about eight Feet; and from thence to Littleport Bridge, from eight Feet to four Feet ſix Inches, and near the Mouth of Brand Creek ten Feet; at Littleport Bridge four Feet nine Inches, and from thence to the lower End of Sandall's Cut, from four Feet nine Inches to five Feet ſix Inches.

From Denver Sluice to the lower End of Sandall's Cut above Littleport, there appears to be at preſent a Depth of Water ſuitable to the Purpoſe of Navigation, but conſiderable Allowances are to be made on two Accounts; firſt, for the preſent Advance of the Water, by the ſhutting of the Doors of Denver Sluice during the flowing of the Tides, which is allowed for in the Section; and ſecondly, for the Increaſe of the Water during the whole Time of the Spring Tides, by having ſo little Time to run out, that the waxing is every Day increaſed; inſomuch that according to the Information of the Toll Bar Keeper at Littleport Bridge, in the Time of the preceding Neaps, before the Spring Tides put in, there was no Water in the Weſt Water-way of that Bridge, where when we took the Soundings we found one Foot ten Inches.

And at Ely Town, where in the Neap it had been entirely dry, there was then four or five Inches Water, and it was generally ſuppoſed that the Water in the River about Ely, was near a Foot higher than it had been in the preceding Neap.

From Sandall's Cut to Prickwillow Bridge, the River is ſhallow, there being in many Places not above two Feet or two Feet and an half Water, and in ſome Places not above one Foot ſix Inches, notwithſtanding it was generally ſuppoſed that it was higher by near a Foot than it had been in the Neaps.

At Prickwillow Bridge, comes in the River from Mildenhall and St. Edmund's Bury, at the Mouth of which the Water was about one Foot four Inches deep, and in it a little above the Bridge, a Gang of Lighters was lying, in Order to go up that River, but were ſtopped for want of Water, though it had not, as we were informed, above a Chaldron and an half, or two Chaldron of Coals in a Lighter, which uſed to carry ſix Chaldron or upwards; which appeared to be the Caſe with other Gangs we paſſed; and the People belonging to that Gang informed me, that they ſhould be obliged to lye there till ſome other Gangs either came up or down, to aſſiſt them *with more Horſes*, by which Means, and by emptying Part of the Loading out of ſome of the Lighters, firſt to be drawn ſome ſmall Diſtance forward, into others occaſionally left behind, and then afterwards lightened into others, and got forward, and ſo by Degrees, with great Trouble they proceed on their Voyage, and are often obliged to aſſiſt each other with Horſes, ſometimes *to the number of twenty to a Gang*, which takes up more than double or three times their uſual Time, and obliges them to make a proportionable Advance in their Freights.

From Prickwillow Bridge, up to Clayhithe, the Water is very ſhallow, the River in a bad Condition, and very unſuitable to the Purpoſe of Navigation, being in general from one

Foot

Foot to one Foot and an half in depth, except in two or three Places below Ely, where it was from two Feet to three Feet nine Inches, but a little below Upwear, there was only about eight Inches, and at Upwear but eleven Inches, as appears by the Section.

At New Lake, above Upwear, two Gangs of Lighters going to Cambridge, were ſtopped for Want of Water, and we were informed, had not above *two Chaldron of Coals in a Lighter* which uſually carried between nine and ten Chaldron, and they were obliged to wait at that Place, for the Diſcharge of the Heads of Water from the Sluices above, which generally raiſed the Water there about ſix Inches. And we were informed by Robert Whitely of Ely, that his Gang lay at Upwear from Tueſday the 8th, to Thurſday Morning the 10th of September, and had but about four Inches Water, before the Heads from the Sluices above were diſcharged, and had only about *two* Chaldron of Coals in each Boat, which uſually carried about *five* Chaldron upon an Average.

From Denver Sluice to Littleport, the Banks are in general placed at moderate Diſtances from one another, but in ſome Places ſtand too near the River.

From Sandall's Cut, a little above Littleport, to Ely, the River on the Weſt Side is not embanked; in this Part the River is very crooked, and the Eaſt Bank is ſet at various Diſtances from it; in ſome Places between Littleport and Prickwillow, it is ſet at ſuch great Diſtances from it, as to make it inconvenient for haling upon; from Prickwillow Bridge, to a Houſe near two Miles above, called the Tiled Houſe, the Banks ſtand pretty near the River, but from that Houſe up to Ely Bridge, the Banks ſtand at a great Diſtance having a large Waſh between them and the River.

From Ely Bridge to Harrimeer, the River is embanked on both Sides, except a ſmall Space on the Weſt Side, between

Barraway Bridge and that Place, where a Waſh from the Skirts of the high Lands comes down to the River; but from Ely to Barraway Bridge, the Banks are ſet at too great a Diſtance from the River, and appear too low for confining a Land Flood.

From Harrimeer, to a Mill called High Fen, or Wicken Mill, about two Miles below Upwear, the River is now embanked on both Sides; the Bank on the Weſt Side is generally ſet at too great a Diſtance from the River.

From Barraway Bridge, up to Harrimeer, the Bank on the Eaſt Side is placed pretty near the River, and in ſome Places cloſe to it.

From Harrimeer to Wicken Mill, the Eaſt Bank ſtands at various Diſtances from the River, having at ſome Places large Waſhes between, at other Places ſtanding at moderate Diſtances from it.

From a little above Wicken Mill to Upwear, on the Eaſt Side, the River is not embanked, a large Waſh from the Skirt of the High Land extending down to it; and the Bank on the Weſt Side in ſome Places ſtands too far off, and in others ſtands near the River.

From Upwear to Clayhithe the River is embanked on both Sides; on the Weſt Side from Upwear, the Bank winds about a Cut which goes out of the River to a conſiderable Diſtance, and comes in again about a Mile and five Furlongs above Upwear.

This Cut was made for carrying Materials for repairing the Banks, in Boats; and for the Convenience of haling on the Bank, the Gangs have often left the River and gone through it, to prevent which there are Poſts put down, with a Boom acroſs it.

The

The Bank being carried round this Cut, takes it much too far from the River.

Between Upwear and Clayhithe, on the Eaſt Side, comes in Reach-lode, Swaffham-lode, and Bottiſham-lode.

The River from Upwear to Clayhithe is very crooked, and in many Places between Upwear and Swaffham-lode, the Eaſt Bank is placed at a great Diſtance from the River. But from Saffham-lode both Banks ſtand at moderate Diſtances from it, and in ſome Places toward Clayhithe are ſet cloſe to it.

The Impropriety of ſetting Banks at ſuch great and irregular Diſtances, has been formerly taken Notice of and condemned, by the famous *Weſterdyke*, *Van Scotten*, and other the moſt emminent Engineers; ſee *Badeſlade's Hiſt. Page* 47; and is certainly very prejudicial both to Navigation and Drainage, by ſuffering great Part of the Water, which is the great natural Agent for preſerving, ſcowering, and improving Channels, to be expanded out of them, over the wide Waſhes; by which Means it loſes a great Part of its Velocity, with which it would paſs through them: for it is well known, that the ſame Quantity of Water which paſſes through a narrow and confined Channel in a given Time, when expanded over a wide Surface, muſt neceſſarily move with a proportionally leſs Velocity, the Water muſt be ſo much the longer in paſſing off, and by the Abatement both of the Quantity and Velocity, paſſing through the Channel in a given Time, its Power becomes too much weakened to force out the Soil, which the ſtronger Current throws into it; and the Channel is continually choaking up, to the great Hurt of Navigation and Drainage.

Another prejudicial Effect attending theſe Baſons of Water is, that by the Force of violent Winds acting upon their expanded Surfaces, they are agitated into Waves, which are drove againſt the Banks, and daſh ſo furiouſly againſt their Faces,

Faces, that they ſoon tear and waſh them down, and make Breaches through them; when if the Water was carried in a properly confined Manner, between Banks ſet at moderate Diſtances, ſo as to be ſcreened from the violent Action of the Wind, and ſecured from the great Agitations occaſioned by it, theſe Miſchiefs would be prevented, and the Country much better ſecured; for the quieſcent Preſſure of the Water againſt the Banks is not comparable to the Force with which it acts againſt them, by the Impulſes of violent Winds; which cannot be better illuſtrated than it is in a Piece written by the ſaid *Edmond Scotten*, (in Anſwer to *Vermuyden)* publiſhed by Order of a Committee of the Fens, and preſented to the High Court of Parliament, in the Year 1642; entitled, *A deſperate and dangerous Deſign diſcovered concerning the Fen Country.*

In which he ſays, "Let Rivers be made large and deep, and "there will be Matter enough ariſing thereout with the In-"dykes, to make high Banks, near on each Side the Rivers. "Theſe Banks being made high, and but a ſmall Diſtance be-"tween, will be a Shelter for the Water that ſhall run betwixt "them, as a Hedge or Wall will ſhelter Cattle that lie next "unto them; ſo that the Wind will have no Power to raiſe "violent Waves againſt theſe Banks to tear them, as the others "ſet at a great Diſtance; ſo that here is one main Miſchief "prevented already.

"A ſecond Miſchief will be hereby prevented, with a Be-"nefit in the Room; for whereas ſuch Banks (ſpeaking of "*Vermuyden's)* though placed at a great Diſtance, could be "made to hold, they would reſtrain the Waters of their for-"mer Liberty, and ſo cauſe them to riſe higher in the Mea-"dows above than formerly, and ſo do much Hurt; which "large and deep Rivers will prevent. For as ſoon as the "Flood begins to riſe in the Rivers above the Fens, it finds "ſuch full and current Paſſage to Sea, that it is taken down as "it begins to riſe; ſo as that which would have been a little "Flood before, will be no Flood now; and therefore in Sum-

"mer

" mer time will be much advantageous to their Meadows,
" cauſing their Graſs to be leſs floated than before.

" A third Benefit by large and deep Rivers by Banks placed
" near the Sides, is this; when a great Flood comes, it finds
" ſuch a full and current Paſſage, that it will be gone half into
" the Sea in ſuch Time, as without ſuch Rivers it will be
" climbing up to get above the Superficies of the Fens between
" thoſe Banks ſo far diſtant: for 'till it be got aloft it can go
" but ſlowly (as is confeſſed by *Sir Cornelius*) wanting the Fall
" it had before; and the Haſſocks, Reed, Sedge, and long
" Graſs will hinder the Paſſage; and as ſoon as it is aloft, the
" Wind will have Power to raiſe violent Waves, which will
" whinder the Banks to Pieces: for it muſt be high againſt
" theſe Banks before the two Rivers will grind out a
" Paſſage.

" Now is it not much better that half a great Flood be ſent
" ſpeedily to Sea, than to lye by the Way tearing and rend-
" ing the Banks.

" A fourth Benefit is, a ſmall Flood or Riſe of Water, being
" pent up between Banks as aforeſaid, will go with Force
" down a deep River, and ſo ſcour and keep open the Out-
" fall, when others loſe a ſmall Flood by the Way.

" It is moſt apparent (ſays this Author) by what has been
" already ſaid, that when the Land Floods ſhall deſcend from
" *Northampton*, *Bedford*, or other Upland Countries, and ſhall
" ariſe in Height four or five Feet over the Superficies of the
" Meadows, they will ariſe ſix or ſeven Feet high between his
" Banks, though placed at a great Diſtance between them,
" and when the Waters are thus aloft near the Top of the
" Banks, the Wind will have ſuch a Power to raiſe violent
" Waves againſt them, that will break them to pieces. (See
" *Badeſlade's Hiſt. Page* 45."

And *Mr. Labyle*, in his Reſult of a View, &c. Page 28, after reciting the above Quotation from the aforeſaid Author, ſays,

" In this laſt Paragraph is contained a true and lively Pic-
" ture of what happens in the Waſhes, between the two Bed-
" ford Rivers and Moreton's Leam, the two Places where the
" Banks are moſt aſunder."

And *Weſterdyke*, who was a Dutchman of Experience, and ſent for to view the Fens, and converſed with Sir *Cornelius*, ſays he could give him no Reaſons for the Practice of ſetting Banks ſo far aſunder. See *Badeſlade*, *Page* 44.

And beſides the beforementioned prejudicial Effects, the placing the Banks at ſuch great Diſtances from the Rivers is very incommodious to Navigation, by the great Inconvenience it occaſions in haling.

As at the Time of Examination, the Water was not only below the Banks, but in general from one to three Feet and upward below the Forelands, there was ſo much the more Room to receive any additional Quantity of Water, that might upon Occaſion be let in.

It was obſerved that as the Seaſon had been favourable for ſuch Works, ſome conſiderable Repairs had been done to ſome Parts of the Banks, particularly to Part of the Weſt Bank, and ſome Part of the Eaſt Bank between Clayhithe and Upwear, the Weſt Bank from oppoſite to High Fen or Wicken Mill to Harrimeer, the Weſt Bank below Littleport Bridge, a Part well repaired, and the Workmen ſtill at Work at it; and between Littleport Bridge and Denver Sluice it appeared that both the Weſt and Eaſt Bank had been repaired in ſeveral Places. But in my Opinion, more might have been done in ſo particularly favourable a Seaſon; but indeed, the Whole wants rectifying,

and

and the Banks ought to be ſet at more proper Diſtances, and to be made ſtronger and higher.

As to their Heights from the preſent Low-Water Mark, they are marked in the Section.

The River from Littleport to Ely being very crooked, it was formerly thought proper to make a new ſtraight Cut from the Old River, at a ſmall Diſtance below the Town of Ely, to meet the Old River again about a Quarter of a Mile above Littleport Bridge, being in Length about three Miles ſix Furlongs, and the Diſtance by the Courſe of the River, about ſix Miles ſeven Furlongs.

By this Cut it was conceived the Waters in the Time of Floods would be conveyed in a ſhorter Time down to that Place, and be more forwarded in their Way to Sea, and the Paſſage of the Lighters and Boats would be ſhortened.

This Cut is generally called *Sandall's* Cut, has been in Decay ſome Time, and is now in a Manner intirely choaked up, and it has been of late propoſed to enlarge and deepen it, ſo as to anſwer the Purpoſes at firſt intended by it.

This certainly might be done ſo as to effect thoſe Purpoſes; but then, as that Part of the Old River between the upper and lower End of that Cut would be neglected and deſerted, *and the Navigation from St. Edmund's Bury and Mildenhall coming into the Old River at Prickwillow Bridge, I am of Opinion that it would be much prejudiced thereby, and all the Lands draining into that River, or any Part of the Old River between that Place and Ely, would be injured;* as in all Times of Land Floods, the Water being brought down through that Cut quicker than it can be by the Old River, it will naturally revert into it, and greatly obſtruct the Drainage by Mildenhall River, and of all the Lands depending on the Benefit of that

Part

Part of the Old River; and the Water carrying the Soil along with it, and meeting and oppoſing the Deſcent of the Waters through it, and the Water coming down the Old River being alſo loaded with Soil, by the Oppoſition of the two Streams their Motions will be retarded, their Velocity abated, and the Soil let down, by which Means that Part will be continually choaking up, *and the Navigation through it greatly injured.*

And in all dry Seaſons, the Waters would almoſt wholly be taken from the Old River, and paſſed through that new Cut, and the Old River being left almoſt dry, the Navigation to *Mildenhall* and *St. Edmund's Bury*, would be totally interrupted, to the great Prejudice of that Part of the Country.

From this Examination it appears to me, that the preſent State of the River from *Clayhithe* nearly to *Littleport* is *very bad, and unfit for the Purpoſes of Navigation and Commerce*, there not being a ſufficient Depth of Water to navigate the Lighters and Veſſels which have been long uſed for the Conveyance of Goods and Merchandize from *Lynn* to *Cambridge, Mildenhall, St. Edmund's Bury*, and other Places, to which they formerly had ſufficient Depths of Water to carry their full Loadings, in convenient Periods of Time; but now by Reaſon of the Shallowneſs of all the Channels above *Littleport*, they cannot carry above one fourth Part of their Ladings; *are ſtopt in many Places a long Time by the Way, are obliged to lighten their Burthens from one Boat to another, and are often forced to wait for one another for the Aſſiſtance of more Horſes than they commonly make Uſe of*, which occaſions great Expence and Delay in their Voyages, and a great Advance of Freight, as I am informed to more than double what it uſually has been; is a great Interruption to Trade and Commerce, to the great Loſs of the Merchants and Traders, and Hurt to the poor Labourers, many of whom, I am informed, are almoſt Starving

Starving for Want of more conſtant Employ; and occaſions alſo the great Diſtreſs of the Country, which in Summer cannot get ſufficient Supplies of Goods for their common Occaſions, or Coals and other Commodities neceſſary for their Winter Stores.

And theſe Inconveniencies appear to me, to be owing to the Stoppage of the Tide by the Sluice put down at *Denver*, by the *Honourable Corporation of Bedford Level*; for the Spring Tides riſing at that Sluice from ſix to ten Feet above the Low Water Mark, (as is generally known) if they were not prevented by it, *would fill the Rivers above it, in ſuch a Manner, that in my Opinion, in the drieſt Seaſons there would be Water ſufficient for all the Purpoſes of Navigation and Commerce.*

And that before Denver Sluice was erected, when all the Rivers above it were free and open, that the Tides flowed into them, they conſtantly anſwered all the Purpoſes of Navigation and Commerce, and that they were greatly injured by the *Stoppage* that Sluice occaſioned, is very apparent, by many authentic Teſtimonies now extant.

Mr. *Goddard*, who was Recorder of *Lynn*, ſaith, the Tides put up into Ouſe about 48 Miles.

That is, into the *Grant* about five Miles above Harrimeer.
Into *Mildenhall River*, about eight Miles.
Into *Brandon* about ten Miles.
And into *Stoke* ſix Miles.

See *Badeſlade's Hiſt. Page* 12.

And from the Teſtimonies of ſome others it appears, that the Tides, before Denver Sluice was erected, have uſually flowed to greater Diſtances than thoſe above ſpecified.

According to the Teſtimony of *John Attleſon*, who had known the River ſixty Years, he ſays, before Denver Sluice was erected, all the Rivers were Free and Open, and received ſuch Quantities of Water from the Floods from *Sea*, that large Barges and Veſſels with from 26 to 30 Chaldron of Coals, did conſtantly paſs with great Eaſe up to Cambridge Town, and that the Water uſually waxed about nine Miles above Ely, which by the Erection of Denver Sluice was intirely ſtopped; and that ſince the Sluices were erected, all the Rivers were ſo ſhallow and grown up, that where the ſaid Barges did uſually paſs with from 26 to 30 Chaldron Freight, at that Time flat-bottomed Lighters with eight or ten Chaldron of Coals, would not paſs without great Difficulty, Charge, and Delay, for *Want of Water*.

And that where in the River between Lynn Haven, and Salter's Lode Sluice, great Barges and Keels uſed to paſs at Low Water, ſuch Veſſels could not then paſs at High Water; ſo as ſuch Barges and Keels had been left off and diſuſed for twenty Years paſt. And all this was atteſted for Truth by Richard Allen, John Curle, William Walwyn, Thomas Chiles, Francis Lord, and others, whoſe Names are mentioned in *Badeſlade's Hiſt. P.* 61 and 62.

And in the 9th Article of a Petition of the Owners, Commoners, and Inhabitants of the Town of *Brandon*, alias *Brandon Ferry*, to the Right Honourable the Lords, and others the Commiſſioners for the regulating of Matters touching the Draining of the *Great Level of the Fens*, preſented after the erecting of *Denver Sluice*, it is ſet forth,

That their Method of Draining was a great Hindrance to them the Inhabitants of the Town of *Brandon*, (that being a Water Town, and many Families having their only Livelihood by the Water Trade) in reſpect of *Navigation*; for thoſe Keels

Keels which formerly came up to Brandon Bridge laden with 20 Chaldron of Coals, were then forced, to their great Trouble, Charge, Loſs of Time, and other Damage, to empty their Coals many Miles off, out of their Veſſels, and bring them up by Lighters.

And *Edmund Ruſſel*, of the Borough of *Thetford*, Gent. made Oath, among other Things, that he had uſed the Trade of a Waterman and Merchant about 45 Years, and that he remembered the building of Denver Sluice; and that before the ſaid Sluice was built, he did remember that the Tide did ſwell as far as *Ebilton Lode*, being within eight Miles of the aforeſaid Borough of *Thetford*, and that his Barges with about ten Chaldron of Coals in them, uſed to come up to *Chriſtopher's Bridge*, in the Borough aforeſaid; but after the Building Denver Sluice, they could not come up with above two or three Chaldron at moſt, when the Water was higheſt by Reaſon of Floods, and with much leſs when the Water was low by Reaſon of Drought.

And *Francis Ruderham*, of the ſaid Borough of *Thetford*, made Affidavit to the ſame Effect, ſaying, he remembered Barges coming up to *Chriſtopher's Bridge*, in the Town aforeſaid, laden with 14 or 15 Chaldron of Coals, before *Denver Sluice* was erected, but after, except in great *Floods*, with not above *two or three*.

Theſe are the Subſtance of Part of the Depoſitions taken before *Jonah Browning*, *Mayor*. (See *Badeſlade*, *Page* 53.)

And the ill Effects of *Denver Sluice*, both in Reſpect to *Navigation* and *Drainage*, are very ſtrongly expreſſed by *Mr. Labyle*, in his printed *Reſult of a View of the Great Level of the Fens*, taken in July 1745, in which he ſays,

" But

" But the Reader muſt excuſe me if I dwell a little longer " upon *Denvers Sluices*, and deſcribe them a little more; " for to that *ill formed, and ſtill worſe executed Project, I cannot " help attributing the greateſt Part of the Miſchiefs that have " enſued, viz. the almoſt total Loſs of an Out-fall to the Fens, the " Ruin of the Navigation of Lynn, and the deplorable State of the " Fens, eſpecially the South Level, in every wet Year, or after any " extraordinary Tide.*

" Firſt, the Breadth of the River Old *Ouſe* (which juſt above " Denvers was then about 150 Feet wide, and has to this Day " 124 Feet Free Water-way through *Downham* Bridge, which " is but a little lower) was reduced by Abutments of Brick " faced with Stone, to barely eighty Feet. Acroſs this pitiful " Out-fall for ſo many Rivers, the People who executed it " were ſuffered to build a ſolid Wall or Dam, eight Feet per- " pendicular above the Bottom of the old *Ouſe*, depriving " thereby the River both above and below, of the greateſt and " beſt Part of its Waterway. Over this cloſe Dam was erected " a Bridge and other Works that left only three Openings of " 18 Feet wide each, which reduced all the Land Waters, " coming down the old *Ouſe*, to be wiredrawn through a 54 " Feet Water-way; to compleat the Matter, three Pair of " Breaſt Gates pointing to Seaward, were placed over this " Dam, whereby no Part of the Flood Tides was ſuffered to " run up above Denvers. Laſtly, ſo little Regard was had to " the Inland Navigation, that no Lock was provided, nor any " Contrivance to let the Boats paſs when the Gates were ſhut, " it being impoſſible to open thoſe Gates all the latter Part of " every Flood, that was not over ridden by the Land Waters " of the Old *Ouſe*; nay, the very Land Waters that came down " the New Bedford River with Rapidity, have kept thoſe Gates " ſhut, as is well known, for three Weeks together. Who- " ever was the Director of this Work, whether Sir *Cornelius* " himſelf, or as I have been told, Sir *John Fitch*, of the Bo-

" rough

" rough of *Southwark*, (a Man famous to this Day among the " Boys, for his celebrated *Fleet Ditch)* muſt be taxed with an " Ignorance which is *almoſt criminal*, if the Miſchiefs and ill " Conſequences thereof were attended to."

And all theſe Teſtimonies and Hiſtorical Facts, and many others to be met with in *Badeſlade's* Hiſtory, plainly ſhew the great Injury and Miſchief formerly done to Navigation and Commerce by the Stoppage of the Tides out of their ancient Receptacles, by the firſt putting down of *Denver Sluice*; and the great Advantage their free Admiſſion were formerly of, and now would be to *Trade* and *Navigation in all Seaſons*, even in the moſt *dry ones*; for the Flux and Re-flux of the Tides being conſtant and uninterrupted, the Advantages received from them are continual, and in the moſt dry Seaſons their Benefit is *extended* the fartheſt.

And though the Miſchiefs complained of are to be underſtood of the *Old Sluice* originally built, which was blown up by the Tides many Years ſince, and that which is now ſtanding was erected ſeveral Years after, and in ſome Particulars much better conſtructed, its Foundation, as appears by ſeveral Circumſtances, being laid lower, and the Water-ways made larger; yet the Tides being as abſolutely ſtopped out of their ancient *natural Receptacles by it*, as they were by the former, all the Injuries and Miſchiefs occaſioned to *Navigation* and *Commerce*, as well as to *Drainage*, by the *Stoppage* of the Tides and Obſtruction to the free Deſcent of the *Freſhes* by the *former*, are in like manner continued by the *latter;* and thoſe Injuries, in my humble Opinion, will neceſſarily be continued 'till the Tides, as formerly, have their free Admiſſion into their ancient Receptacles, and the ſeveral Rivers within Reach of their flowing.

And if thoſe Rivers were *properly imbanked*, as the Act of Parliament for Drainage made in the Year 1649 directs they ſhould be, and as the Opinion of *Weſterdyke*, *Scotten*, *Lord Gorges*, and other eminent Engineers, at the Time of the Undertaking, were of Opinion they ought to have been; and what appears to me now very practicable, in proper Seaſons, to be done; the Lands in the *South Level* would not in the leaſt be prejudiced thereby, but on the contrary, by the Increaſe of the Quantity of Ebb Waters, the Channels would conſtantly be ground *deeper*, and the Out-fall continually *improved*; as according to authentic Hiſtory, it had been the Caſe for ſome Hundred Years preceding, down to the Time of the firſt erecting *Denver Sluice*, to the great Advantage of *Drainage* as well as *Navigation*, at leaſt from the Time of Edward the Third, 1342, to 1650, as appears by a Petition from the Inhabitants of Marſh Land, then preſented to him. (See *Badeſlade's Hiſt. Page* 7.)

In the preſent State of the River, all the Advantage the Navigation receives is, in the Spring Tides, by the riſing of the Freſhes at Denver Sluice, occaſioned by the long ſhutting of the Sea Doors at thoſe Times, as has been before deſcribed.

But if the Ebb Doors were in good Repair, and they were kept ſhut for ſome reaſonable Continuance of Time, as it appears to me, that they would raiſe an Head of Water of four or five Feet above the preſent Low Water Mark, I am of Opinion in the preſent State of the River, that would be ſufficient to carry the Lighters nearly to *Harrimeer*, with moderate Loadings.

But as one of the Ebb Doors is entirely gone, and a new one muſt be made, before they can be uſed for the before-

mentioned

mentioned Purpoſe, and there are at preſent no Ebb Doors to the Eaſternmoſt Eye, I apprehend little Benefit can be received from them, before the Seaſon naturally alters, and Supplies of Water may be obtained by the Courſe of Nature.

In the mean Time, from my View of the preſent State of the Banks, and the Water in the different Parts of the River above the Sluice, I am of Opinion, that ſuch moderate Tides as riſe about ſix Feet above the preſent Low Water Mark at the Sluice, might be let in, without Danger to the Banks and Lands, and would not only be much to the Advantage of Navigation, by affording Water for the loaded Lighters up to *Harrimeer*, or in the preſent State of the River perhaps higher, but by the conſtant Flux and Re-flux of ſuch Tides would ſcour the Channel below the Sluice, which they ſay is much grown up, which would greatly aſſiſt the Drainage as well as the Navigation.

And I apprehend there would be little or no Danger of prejudicing the Channel above, by the Silt which ſuch Tides would bring in; for by Reaſon of the ſmall Quantities of the Freſhes in the River, the Tides would meet with ſmall Reſiſtance, and by the Impulſe impreſſed upon them, they will retain their Motion a long Time, and keep the Silt rolling along with them, till by Degrees impelling the Freſhes before them, they will raiſe them conſiderably, to ſome Diſtance beyond the Reach of the Tide, and upon the Return of the Ebb they will follow and run through the utmoſt Section the Tide approached to, with ſufficient Velocity to prevent the Silt from reſting, and carry it down with the Ebb; and as the Water will fall at the Sluice long before the upward Motion of the Tide is deſtroyed, the Ebbs will return through every Section the Tide had paſſed through with an increaſed Velocity, ſuperior to what the Tide had in going upward, when it was in ſome Degrees continually retarded; but on the contrary the

Ebb

Ebb in its return will be continually accelerated, and therefore more able to drive out the Silt which the Tide brought in, and will prevent the Channel from choaking up.

And that the letting in of ſuch Tides as can properly be contained between the preſent Banks, without over topping them, or the Danger of breaking them (as ſuch Tides beforementioned I apprehend would not do, or at leaſt by ſhutting of the Sea Doors of the Sluice in proper Time, might be prevented from doing) will have any Tendency to the filting up of the Rivers they are received into, but on the contrary will ſcour, deepen, and improve them, beſide the Concluſions drawn from the Nature of Things, and the known Laws of Motion, is further confirmed by the Opinion of *Mr. Labyle*, whoſe great Abilities, Experience, and Judgment in Things of this Nature, is generally known.

In his printed *Reſult of a View of the great Level of the Fens*, beforementioned (Page 66) he ſays,

" *I bent all my Thoughts of finding a practicable Way to perform* " *the Operation of deepening the Ouſe without Men's Labour, or* " *the Uſe of Engines; and I ſoon found, that inſtead of ſhutting* " *the Tides out, by letting them in and out at proper Times jointly* " *with the Land Waters, by increaſing their Velocity, and giving* " *them a proper Direction, I had (if not a certainty) at leaſt a* " *very great Probability of ſucceeding.*"

And as the River was then in a bad State, and much more *filted up* than it is at this Time, as appears by the Obſervations he then made, he further ſays,

" I found by my Obſervations, and the Information I re- " ceived, that none of the Neap Tides ever reached *Denvers* or

" the

" the *New Bedford River*; that at a common Tide, the Riſe of " it is not above a Foot or two at *Denvers* or *Salter's Lode*; and " that a common Spring Tide does not riſe above three Feet " at the laſt mentioned Places, but that it riſes much higher in " extraordinary Tides, eſpecially if attended with freſh " Winds from the N. W. to E. N. E. from whence it plainly " appears to me, *that the free Admiſſion of common Tides can* " *do no Damage to the South Level*, but that the latter Part of " the Riſe of thoſe extraordinary Tides, overflow the South " Level, and always will, 'till the Rivers in it are much better " imbanked, or 'till ſome proper Means be uſed to reſtrain " only that Part of thoſe extraordinary high Tides which does " Miſchief, without reſtraining the far greateſt Part of the " Tides, which *do no harm* to the *South Level*, and are moſt " powerful Agents to keep the Port of *Lynn* (or in other Words " the *Out-fall* of the *Ouſe*) *open*. And, ſays he, how I propoſe " this ſhall be preſently ſhewn;" and after having laid down his Plan, and propoſed the Method for doing it, at the latter End of his Treatiſe, (Page 73) in his Concluſion, he ſays, " Laſtly, I hope in caſe the Honourable Corporation do put " theſe Propoſals in Execution, and find Themſelves as much " relieved thereby as I wiſh and hope they will, I humbly " recommend to their next future Conſideration, the making " or repairing the *Banks* along the *South Level* in particular, " which though it is a Work that requires Time, and a very " conſiderable Expence, it is, after all, the *ſafeſt* and moſt " *natural* Way of preſerving the *Lands* in the *Fens* from being " overflowed by the extraordinary *Tides*, and the *Land Waters*; " for in the Method now offered, or in any other Method, " beſides that of *imbanking*, there can be no other Proviſion " made againſt the Land Floods, than by giving them a larger " and deep Outlet to Seawards; and in my humble Opinion, " to pretend that Lands ſituate as low as the Fens are, particu- " larly in the South Level, ſhould not be overflowed by the " Land Waters, or by extraordinary high Tides, without

" imbanking the Rivers, is to pretend, that Nature *ſhould act* " *differently* in the *Fens*, from what it does *every where elſe*."

If by the letting in of ſuch Tides as beforementioned, the Lighters ſhould be aſſiſted to *Harrimeer* or beyond, as I apprehend in the preſent State of the River *they would be*; as I am informed there are *Water Mills* for the *grinding Corn*, at *Landwade* above Burwell, which Work into *Reach Lode*; others at *Swaffham*, which Work into that *Lode*; and others at *Bottiſham*, which Work into that *Lode*; and all theſe *Corn Mills* being conſtantly ſupplied by natural Springs lying above them, are worked almoſt every Day, and ſend down their Waters through their ſeveral Lodes, which all lying above *Upwear*, the Stream there is viſibly quickened by them, to ſome conſiderable Diſtance below that Place, but the Water in the River is not ſenſibly raiſed, by reaſon of the free Paſſage it has downward, by the clearing of the River from Weeds, by the working of that Machine called the *Bear*, which I am informed has been uſed in that Part of the River this Summer, and pretty much in the lower Parts of the River laſt Summer, by which Means the River has been more cleanſed of Weeds, and the Water has had a more free Paſſage down than uſual, and in the upper Parts of the River, run lower than it otherwiſe would have been.

I am therefore of Opinion, in the preſent State of the River, if a Stank was made acroſs it, about a Mile or a Mile and an half below *Upwear*, it would ſoon raiſe a Head of two or three feet Water, which while kept up, would carry the Lighters up to Clayhithe, and when diſcharged would bring them up from Harrimeer to that Stank, which would much facilitate their Paſſage; but I muſt at the ſame Time recommend deepening the River in all thoſe ſhallow Parts, and altering the Situation of the Banks, and placing them at proper Diſtances from it.

And

And if that was done from *Clayhithe* to about half a Mile below *Prickwillow Bridge*, in the Manner exhibited by the dotted Line in the Section marked A. A. as the Fall between thoſe two Places would by that Means be conſiderably leſſened, a proportionably greater Depth of Water would be kept up from the ſame Supplies above, which in my Opinion in ſuch dry Seaſons might be ſufficient for the Purpoſes of Navigation in that Part of the River; and by deepening a few particular Places between Prickwillow Bridge and the lower End of Sandall's Cut, there might in all ſuch Seaſons be a practicable Navigation obtained from Denver Sluice up to Clayhithe.

But if the River ſhould be ſo deepened, as the Bottom juſt below Clayhithe Sluice would be reduced below the preſent Floor, it appears to me, that it would be then neceſſary to lower the Floor equal to it, which I apprehend might be done at a much leſs Expence, and would prevent the Occaſion, for erecting a new Lock below it, for the Purpoſe of raiſing an Head of Water for the carrying the Lighters into it.

In ſuch a particularly dry and favourable Seaſon as this has been, I am humbly of Opinion that the ſcouring out and imbanking the Old River, from Harrimeer to the Hermitage at Earith, ſhould not by any Means have been neglected; as when properly deepened and embanked, in Ordinary, and in Wet Seaſons, it would not only have been of very great Service to the *Drainage* of the Lands in *Haddenham Delphs*, *Willingham*, and all *other Parts* adjacent; but it would alſo open a ſhort and commodious Navigation between *Cambridge*, *St. Ives*, *Huntingdon*, *St. Neots*, and *Bedford*, to the great Advantage of *Commerce* as well as *Drainage*.

But in the preſent State of the River *Grant* I am doubtful, whether in ſuch dry Seaſons, (when the Water in the *Ouſe* muſt

muſt be very low, and the *Hundred Feet* River ſo very ready to take it off,) it would bring any additional Quantity into that River.

And I can at preſent think of nothing more than what has been ſaid, for the Advantage of the *Navigation* in the River *Grant*, 'till the *South Level* is compleatly *imbanked* and the Tides are admitted to have their *free Paſſage into all their ancient Receptacles above the Sluice*, which for ſome Hundreds of Years preceding they uſed to fill, during all which Time Navigation and Commerce were *flouriſhing*, and the Rivers *improving*; and *imbanking* appears to me to have been, and according to the Opinions of ſome of the moſt able *Engineers* was, the main, if not the *only* Thing wanting to compleat the *Drainage*, and to make the *South Level* a ſafe and fruitful Country.

I am, Gentlemen,

Your moſt dutiful,

And moſt obedient Humble Servant,

London, Sept. 28, 1778. WILLIAM ELSTOBB.

P. S. As no new Levels have been taken, the Falls in the Section are laid down ſimilar to what they were found to be in the Year 1776, when a Chain of Levels was actually taken: but as the State of the Water is very different from what it then was, in this dry Seaſon, there is much leſs Water in the upper Parts of the River than there is in its ordinary natural State, and the Falls by that means muſt be proportionably leſſened, and Tides of equal Heights at Denver Sluice will now flow much further up the River than it appears they ought to do by the

the Section, or than they would have done in an ordinary State of the River, as is evident from the preſent Circumſtances of the Hundred Feet River, into which in the ordinary and natural State, when there was a moderate Quantity of Freſhes in the upper Part to reſiſt the Progreſs of the Tides, the Spring Tides uſually flowed up to *Mepall* or *Sutton Bridges*, at the Diſtance of about 15 and 16 Miles and an half above Denver Sluice, but in this dry Seaſon, when there is but little Water in the upper Parts of the River to reſiſt the Motion of the Tides, if I am rightly informed, they flow up two or three Miles above *Earith* to the Diſtance of 22 or 23 Miles above Denver Sluice; and the like Difference would now happen in the River *Grant*, if the Tides were admitted in at Denver Sluice; all which Differences are to be properly allowed for in the Section.

N. B. It is to be obſerved, that it is not Denver Sluice as a *Fabric* or *Structure*, that is ſo loudly and juſtly complained of, but as a Dam, an Obſtruction, an Impediment, and Stoppage, both to the free Admiſſion of the Tides and the Deſcent of the Freſhes; which has occaſioned ſuch great Injuries and Miſchiefs to Navigation and Commerce, and prevented the Benefits expected to have been received by a complete *Drainage* of the *South Level*.

Theſe Evils were originally occaſioned by laying the Foundation of the Sluice eight Feet higher than the natural Bottom of the River, by contracting the Paſſage of the deſcending Freſhes from 150, the natural Breadth of the River, to 54 Feet, in three Openings of 18 Feet each; by ſtopping the Tides out of their natural Receptacles, by the placing three Pair of Sea Doors in the aforeſaid three Openings; and laſtly, by turning the Water of the great Ouſe into a new ſtraight Cut, and ſhorter Courſe, which occaſioned thoſe Doors in Time of Land Floods to be kept continually ſhut, and the Deſcent of

the Freſhes which ſhould have paſſed through for that Time to be entirely ſtopped, to the great Prejudice of the *Drainage* of the *South Level*, and Interruption of *Navigation*.

In the Conſtruction of the preſent Sluice ſome of theſe Evils ſeem to have been attended to, but not perfectly removed; the Waterways in the Whole are enlarged, but not ſufficiently, the Low Water Channel above the Sluice in the ordinary State of the Water being about 160 Feet wide, and the Channel below the Sluice about 152 Feet, but the whole of the Waterways in the Sluice are but about 95 Feet; and to every one are fixed Sea Doors, which ſtop the Tides out of all their natural Receptacles above it, the ſame as at *firſt*.

The Floors of the Waterways in the preſent Sluice being, according to the Levels taken in 1776, about 10 or 12 Feet below the Soil of the Lands, they appear to be conſiderably lower than the Foundation of the original Sluice, but as they were then found to be near two Feet above the Bottom of the River, they ſtill want lowering about two or three Feet, which might eaſily be done, by taking up the preſent Floors, and driving down what Piles there may be in them two or three Feet lower; or by ſawing off ſo much of their Heads, as to make them anſwerable to it, as they now ſtand.

And as the whole Length of the preſent Sluice from Side to Side is about 183 Feet, and the Waterways altogether but about 95 Feet, there is ſufficient Room to make a conſiderable Enlargement, which might be done in the following Manner.

The three Waterways of about 18 Feet each, are now in the *Weſt* Part of the Sluice, between which are two *Piers* of about nine Feet eleven Inches each; between thoſe Waterways and the Pen Sluice on the Eaſt ſide, is a Body of Earth faced with Stone,

Stone, of about 61 Feet in length, as may be ſeen in the Section; if the Pier now ſtanding between the Middle and Eaſternmoſt of the principal Arches was taken away, and thoſe two Arches were laid into one, they would form a Paſſage of about 46 Feet in the Clear, between which and the Pen Sluice a new Waterway might be conſtructed of about 36 or 37 Feet wide in the Clear, which with the Weſternmoſt one of 18 Feet now ſtanding, would make three Waterways, which taken altogether would be about 96 Feet in the Clear, beſides the preſent Pen of 13 Feet ſix Inches, and Ruſſel's Eye of 19 Feet, which will then make the Whole of the Waterways about 140 Feet, which is 45 more than there now is, and more than the preſent Clear Waterway is at Downham Bridge, which according to Calculation made Mr. *Labyle*, (in his *Reſult of a View*, Page 49) is ſufficient to carry all the Waters which are to be carried from the *Fens* through the Out-fall at *Lynn;* due Allowance being made for the Interruption occaſioned by the Tides; provided they were conſtantly to run with a certain Velocity of about 100 Feet in a Minute, and five Feet in Depth uniformly.

The Waterways at Denver Sluice being ſo enlarged, and the Floors of the Waterways lowered as before mentioned, would be very ſufficient for the free Deſcent of the Freſhes, and if kept clear and open, for the free Admiſſion of the Tides alſo, into all their ancient natural Receptacles; and provided the South Level was properly *imbanked*, which is the primary and eſſential Work, and therefore ought in all Reaſon firſt to be done, *no Injury, but on the contrary very great Benefit, would accrue to the Lands thereby, they would be ſecured, the Rivers would be deepened, their Drainage promoted*, and they would be free from Inundation, and fitted for Cultivation; and Navigation and Commerce, as formerly, would be carried on with little Expence and great Facility. *All the Injuries ſo juſtly complained of theſe hundred Years paſt* (excepting the reverting

reverting of the Land Waters brought down the Hundred Feet into the Cambridge River) *would ſoon be removed, but that I apprehend can never be prevented ſo long as the Hundred Feet River continues open.*

And as I look upon this to be the cheapeſt, ſo do I apprehend it will be as effectual for the Purpoſes before mentioned, as any other can be; I therefore humbly ſubmit it to the Conſideration of the Public, and thoſe more immediately intereſted: I muſt only beg Leave again to obſerve, that without the Rivers are firſt properly and ſufficiently *imbanked*, it is in vain to expect that the Lands in the *South Level* can ever be effectually *drained*, or properly *ſecured*.

W. E.

LONGITUDINAL SECTION OF THE RIVER FROM

CLAYHITHE — Botsham Lode — Swaffham Lode — Reach Lode — UPWEER — Red Lion at Dimmocks Cote — Wicken Mill — Harrimar — Barraway Bridge — ELY Bridge — near the End of Sandels Cute — near the Tilad House — near a Mill

28 — 27 — 26 — 25 — 24 — 23 — 22 — 21 — 20 — 19 — 18 — 17 — 16 — 15

Wharf — East Bank — E. Bank — E. Bank — West Bank — W. Bank — East Bank — East Bank — E. Bank — Brace — E. Bank

Bottom of the Pen

A

This Line shows how much the River should be deepend from Clayhithe to Prickwillow Bridge

A

SURFACE BOTTOM OF

MILES — HORIZONTAL LEVEL

28 — 27 — 26 — 25 — 24 — 23 — 22 — 21 — 20 — 19 — 18 — 17 — 16

LATTERAL SECTION OF DENVER SLUICE

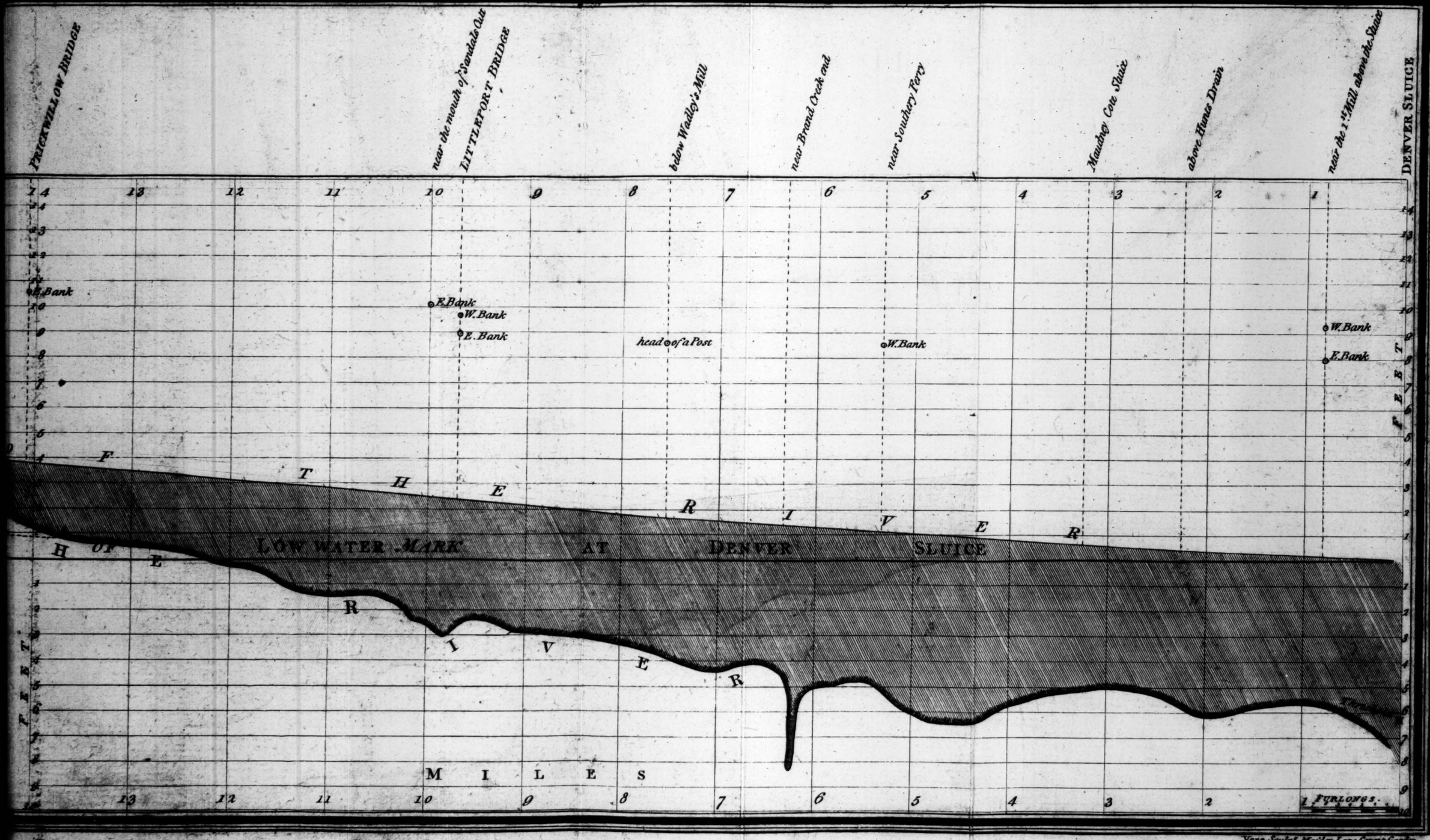
WATERWAY	Pier	WATERWAY	Pier	WATERWAY	A large body of Earth faced with Stone	PEN	Pier	RUSSELS EYE
F. In. 20.9.	F. In. 9.11.	F. In. 20.9.	F. In. 9.11.	F. In. 20.9.	61 feet.	F. In. 13.6.	F. In. 7.7	F. 19.

Whole bredth 183 F. 2 In. Clear Waterway 94 F. 9 In.

Ifl wyn del.

16

CLAYHITHE TO DENVER SLUICE. *by William Elstobb, September 1778.*



Vere Sculp.t Maiden Lane Corn.t Garden.

APPENDIX.

To the GENTLEMEN MERCHANTS *and* NAVIGATORS *concerned in the* NAVIGATION *from* CAMBRIDGE *to* LYNN.

GENTLEMEN, *Upwell, Nov.* 1778.

HAVING read the MS. containing Mr. Elſtobb's Report of the preſent State of the Navigation on the Rivers Ouze and Grant, and obſerving that the Shallowneſs of the Water in many Places occaſioned an Increaſe in the Number of Horſes, to drag the Lighters on the Bottoms of the River, with three or four Chaldron of Coals, where formerly Barges with between 30 and 40 Tons could paſs. (*There being* (*Rep. p.* 69.) *but three Feet Water now in many Parts, where once was ſeven.*) This Obſervation naturally led me to enquire into the Truth of the 19th Allegation of the Petition of the Bedford Level Corporation, and to examine the Evidence brought in Support of it.

That Allegation ſays, "That the Commerce on the Rivers running through "the Great Level is of late Years greatly increaſed; that *the Burden of the* "*Barges and Lighters navigating through the ſame; as alſo the Horſes haleing the ſaid* "*Barges and Lighters, are increaſed in their Number and Size, &c.*"

In order to *prove* this Allegation, *Mr. James Golborne* gave the following Account. That between the 4th of May 1776, and the 3d of February 1777, there had paſſed,

			Tons.		Horſes.
On the Hundred Foot River -	2692	Boats and Lighters	24564	drawn by	1265
On the Ouze, through Denver Sluice	7070	carrying together	54582		3694
On the New and Old Bedford - -	4101		32239		2059
Through Stand Ground Sluice, on the Nene, from 16th of May, 1776, to February 2, 1777,	3617		23503		1611
In all	17480		134888		8629

Such it ſeems was the State of the Navigation at the Time above mentioned, but how it can prove that the *Commerce*, the *Number of Boats or Lighters*, *the Tonnage of the Boats*, and Number of Horſes are increaſed, is above Comprehenſion. They have indeed given an Account of the preſent State of theſe

Things, but have ſaid nothing of what it was formerly, without which the Evidence is incompleat, and proves nothing. But we may take it for granted that the Number, according to Mr Golborne's Report, is *true*, (and that the Corporation would by no Means have ſuffered him to produce it, if it was otherwiſe;) we will therefore compare it with the State of the Navigation 50 Years ago, as given in a Pamphlet called an *Inquiry* into *Facts*, containing the Subſtance of the Adventurers Petition, and ſuppoſed to be written by the ſame Perſon. He gives no Account of the Number and Tonnage of the Barges, and Manner of Navigating them before Denver Sluice was built, but (Page 48) he ſays, "*Fifty Years ago, no Gangs carried more than Fifty Chaldron of Coals* out of "Lynn Harbour, or haled with more than *two Horſes*. There are now many of "the Gangs that carry a *Hundred Chaldron*, and by being haled with *five* Horſes, "and often with *many more*, and thoſe too Horſes of the ſtouteſt Make and largeſt "Size, *are dragged heavily on the very Bottoms of the Rivers*." This Account does not prove that the Commerce is increaſed, but by comparing it with Mr. Golborne's Account, it proves that the Tonnage of the Lighters is *diminiſhed*, although the Number of them and Horſes are increaſed; for if *two* Horſes were then ſufficient to hale a Gang containing 50 Ton or Chaldron of Coals, four Horſes might *now* hale 100, and the Number of Barges be doubled, but they ſay that the Number of Barges and the Tonnage is increaſed in far greater Proportion. But if no more than two Horſes were neceſſary 50 Years ago, to hale a Gang containing 50 Chaldron of Coals, (or Tons of other Goods) then, the 134,888 Tons might have been haled with 5395 Horſes; and if the Tonnage of the Boats or Lighters, were from eight to twelve Tons, then 13,488 Boats were ſufficient to contain the ſame Number of Tons, and the two Accounts will ſtand as follow.

In the Years 1776 & 1777,	17480 Boats, and	8629 Horſes,	carried 134,888 Tons.
In the Year 1720,	13488 Boats, and	5395 Horſes,	carried 134,888 Tons.

Conſequently there are 3992 Boats, and 3234 Horſes employed now, more than there were 50 Years ago, to do the ſame Work; and the Tonnage of the Lighters was at leaſt ten Tons upon an Average at that Time, but is now a little more than ſeven and an half, as appears from the ſame Account of Mr. Golborne. But this Year the Tonnage muſt have been greatly decreaſed, occaſioned partly by the dryneſs of the Seaſon, but principally by ſtopping the Tides at Denver Sluice, and ſuffering the little Water which came down the Ouze to run off at Low Water.

What the Expence of keeping 3234 Horſes, and 3992 Lighters, with Men and Boys to attend them, would amount to in 50 Years, I will leave others to calculate; but it ought to be obſerved that the Increaſe of Labour, the Loſs of Time, and the Damage which the Lighters receive by being *dragged on the Bottoms of the Rivers*, has advanced the Price of Freight 1s. 3d. per Ton, at a Medium, during the laſt 50 Years; from whence it is eaſy to calculate the Damage ſuſtained by the Country in their Commerce during that Period; which is very nearly as follows:

The

APPENDIX.

The Quantity of Goods annually navigated through the ſeveral Rivers paſſing through the Fens, is computed at 150,000 Tons, which at 15d. the Ton amount to — — — — £. 9375 0 0
The Tolls paid on the Grant above Clayhithe, are about — 1200 0 0

And together amount to 10,575 0 0
Theſe have been paid 50 Years — — — 50 0 0

And amount to 528,750 0 0
The Tolls on the Nene amount to 800l. per Annum, and have been paid 20 Years, which adds — — 16,000 0 0
To theſe may be added, for haleing on Diſtrict Banks and private Banks within the 50 Years, 100l. per Annum 5,000 0 0

£. 549,750 0 0

Which Sum has been paid by the Conſumers of the ſeveral Commodities navigated through the Fens ſince the Year 1728, for the extraordinary advance of Freight; the Cauſe of which is clearly pointed out by Mr. Elſtobb, in his Report. When this Sum is compared to the Damage done to the Banks by haleing, the *Adventurers* can have no Room to complain, eſpecially when it is ſhewn how much they have ſaved by this Undertaking, ſince the 15th of Charles II. which may be thus eſtimated, from the Accounts of Mr. Cole, their Regiſter.

It appears (by the Report of the Committee, p. 42,) that 40,000 Acres, part of the 95,000, were ſet out, and ſpecifically allotted for the Maintenance of their Works. The neat Rent of which was 10,000l. per Annum, and in 113 Years amounts to — £. 1,130,000 0 0
In which Time it appears, by the ſame Reports, (p. 159) they had expended on all the three Levels — — £. 500,000
Beſides a Debt on Account of the Middle and South Levels of — 38,500.
In all 538,500 0 0
Which deducted, leaves a clear Profit from the 40,000 Acres of 591,500 0 0
And ſo much they have gained over and above the clear Rent of 55,000 Acres, which they were in full Poſſeſſion of at the ſame Time; and at the rate of five Shillings per Acre only, amounts in the ſame Period to 1,553,750l. and together makes 2,145,250l. With theſe Gains, and an annual Income of 25,000l. they are not ſatisfied, but want the Country to raiſe an additional Sum of 25,000l. per Annum for ever; although it is evident from their own Accounts, that (including the Intereſt of their Debt, and the Salaries of Officers, &c.) *they have not expended on all their Works, ſince the 15th of Charles II.* (which is 113 Years) near 500*l. per Annum, one Year with another.*

Notwithſtanding *the Injuries done to Commerce, already amount to near* 12,000*l. a Year*, they demand a farther Sum of 10,000l. under a Pretence of repairing the

the Damage done to their Banks by haleing; which *Damage*, according to the largeſt of their Eſtimates, *cannot exceed* 1700*l.* (*ſee p.* 86 *and* 89 *in Rep. of the Committee*) and in this they include many Miles of Bank *they never made*; others that are never haled upon, or are paid for as Turnpike Roads, or belonging to private Diſtricts.

From the *Owners of Free Land*, they demand a perpetual *Tax of* 15,000*l. a Year*; although they have already got one third of their Property, and the remainder is as liable to be drowned as before; and if any Part is now drained, it has been done at their *own Expence*, by the Conſent of the Adventurers, and by *Mills or Engines*, which by the 20th Allegation of their Petition, appear to be as prejudicial to a General Drainage as to Navigation; *cauſing the Beds of the Rivers to grow up, and hath much decreaſed the Depth of the ſame.*

As the Navigators have been adviſed, under a Maſk of Friendſhip, to unite with the Adventurers for bringing in a Bill to Tax themſelves and the Owners of Free Lands, will it not be for the Intereſt of both Parties, as joint Sufferers, to conſider what Steps can be taken to relieve themſelves, and oblige the Corporation to do Juſtice to an injured Country?

Although the Adventurers are bound *to reſtore the Navigation at their own Expence, if prejudiced by their Works*; (*and the whole* 95,000 *Acres are as liable to be taxed for that Purpoſe as for draining the Lands*) the Loſſes already ſuſtained are irrecoverable; but it is in their Power to reſtore the Navigation to its former State; and by deſerting their ruinous Schemes, to drain and preſerve the Country. They have a Fund ſufficient for both, if they will raiſe and properly apply it; and if the Owners of Free Land, and the Counties injured by the Damage done to the Navigation, will not call upon them to do it, let them tamely ſubmit to every Tax the Adventurers may hereafter think proper to impoſe upon them; but let them be deſpiſed by all good Men, for their mean and abject Spirit, who by an occaſional Advance of Freight, which an uncommon Drought made neceſſary, were frightened into a ſhameful Compliance with a Scheme to burthen themſelves and *Poſterity with a heavy Tax*, without any Proſpect of immediate Relief, or future Benefit; for "*The Money raiſed by a Mortgage on the* "*Tolls will be all ſquandered away in private Jobbs and problematical Projects, and* "*the Country and Navigation left in a worſe Condition than at preſent, with every* "*poſſible Reſource for future Aſſiſtance entirely exhauſted and conſumed.*"——(*See Remarks on a Bill*)

As the Oppoſition you have already made, deſerves the Thanks of the Public in general, I hope your Zeal for their Service will be gratefully acknowledged, and liberally ſupported. And am, Gentlemen,

Your Well-wiſher, and Humble Servant,

HYDROCÆTES.